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FIELD MANUAL

ARMY WHOLESALE MAINTENANCE MANAGEMENT

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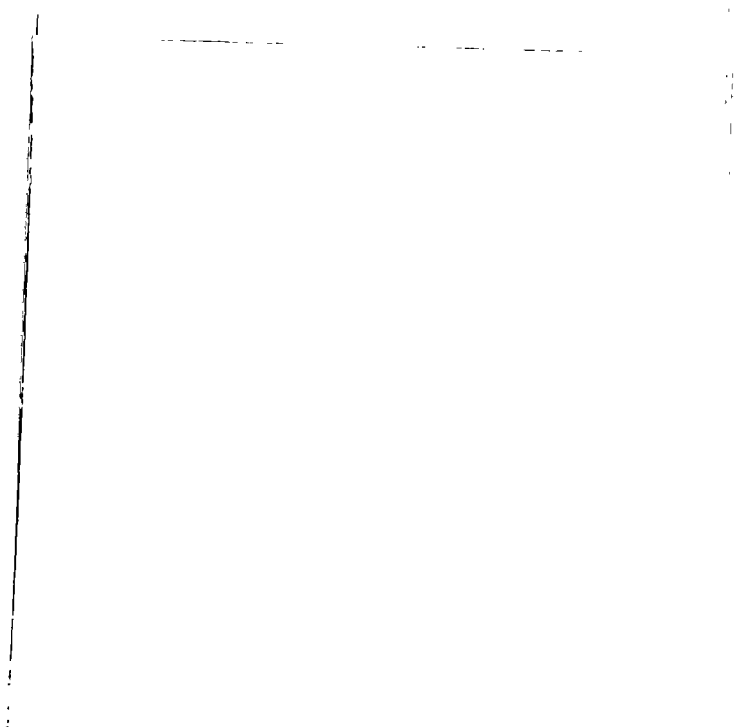
HEADQUARTERS, DEPARTMENT OF THE ARMY
AUGUST 1987



FIELD MANUAL
No. 750-80

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *31 August 1987*

ARMY WHOLESALE MAINTENANCE MANAGEMENT

Effective support of our fighting forces requires a coordinated maintenance system. Neither the wholesale nor retail communities can provide support in isolation from the other. This manual illustrates wholesale maintenance and the wholesale/retail interface.

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* This manual supersedes FM 750-80, 1 September 1983.

CHAPTER 1

INTRODUCTION

1-1. Purpose and Scope

a. The purpose of this manual is to establish wholesale materiel maintenance management doctrine. Army Regulation (AR) 700-9, Policies of the Army Logistics System, 15 October 1981, defines logistics doctrine as, "A collection of the best thinking the Army has to offer on how to perform a particular combat service support in wartime." Consequently, the intent of this publication is to provide information about wholesale maintenance which will be useful in planning for and providing support in time of war. Commanders, staff officers, logisticians, and nonlogisticians need to know how wholesale maintenance supports the Army's combat strength. Not only is this knowledge applicable to the Active Army, but it is equally applicable to the Army National Guard and the Army Reserve. This doctrine is for use in war and contingency planning, logistics planning, and force modernization, as well as in improving everyday operations.

THIS MANUAL PROVIDES THE DOCTRINE FOR LOGISTICIANS TO PLAN TO OPERATE IN WAR JUST AS WE DO IN PEACE.

1-2. Recommended Changes

a. Since changes in doctrine are continually occurring, users of this field manual are encouraged to make comments and recommend changes which will improve the technical quality of this document.

b. When changes are recommended, all comments should be directed to the specific page, paragraph, and line of the text. To ensure understanding and accurate evaluation, it is requested that reasons for a change be provided for each comment. Comments should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded directly to the Commandant, United States Army Logistics Management Center (ALMC), ATTN: AMXMC-MR-MM, Fort Lee, Virginia 23801-6049.

1-3. Explanation of Terms

a. Materiel maintenance is the function of sustaining materiel in an operational status, restoring it to a serviceable condition, or updating and upgrading its functional usefulness through modification and product improvement. The maintenance function includes varied types of activities performed by many different organizational elements. The ultimate goal of these organizations is to create and sustain combat readiness in the Army. Because maintenance activities are so diverse, they can be categorized in many different ways. A basic method of identifying maintenance is to divide it into two subfunctions: maintenance engineering and maintenance operations.

MAINTENANCE IS:
SUSTAINING
RESTORING
UPGRADING

b. Maintenance engineering is that activity of materiel maintenance which develops concepts, criteria, and technical requirements during the materiel acquisition process. After acquisition, maintenance engineering activities continue to ensure timely, effective, and economical maintenance support throughout the entire life cycle.

c. Maintenance operations constitute the actual physical performance of maintenance and the management of such performance. Maintenance operations are generally divided into three levels. These are unit, intermediate direct support (IDS) and general support (IGS), and depot, as addressed in AR 750-1, Army Materiel Maintenance Concepts and Policies. These levels of maintenance identify the scope of the operation which may be performed at various command levels. The responsibility to perform maintenance within a given level is assigned to a unit or activity under maintenance planning developed during the materiel acquisition phase. This responsibility is based on mission; degree of mobility and complexity; intended, or availability of personnel; skills; and materiel

resources. The collective objective of each level is to restore materiel to a state of serviceability.

MAINTENANCE OPERATIONS=
PERFORMANCE
INSPECTION
TESTING
SERVICING
CLASSIFICATION
RECLAMATION
REPAIR
OVERHAUL
REBUILD
MODIFICATION
CONVERSION
CALIBRATION
RENOVATION

(1) Unit maintenance is the preventive and corrective maintenance performed by a using unit on its own equipment.

(2) Intermediate direct support maintenance units provide DS to the user by repairing and returning materiel directly to the user and repair of high usage components for Reparable Exchange (RX).

IDSU=REPAIR & RETURN TO USER

(3) Intermediate general support maintenance units perform those maintenance actions required to support a force as a whole, rather than specific elements. Intermediate (GS) maintenance units are normally located at echelons above corps and perform maintenance in support of the theater supply system through the repair of assemblies, components, and modules, RX items, printed circuit boards (PCB), and operational readiness float (ORF).

IGSU=REPAIR & RETURN TO SUPPLY SYSTEM

(4) Depot maintenance is the highest level of maintenance, performing those tasks which cannot be performed at a lower level. It is performed in fixed facilities in Continental United States (CONUS) and the theater of operations (TO), and is production line oriented.

(5) An exception to the above is aviation maintenance. The three levels of aviation maintenance are aviation unit maintenance (AVUM), aviation intermediate maintenance (AVIM), and aviation depot maintenance.

d. Retail maintenance is the maintenance activity performed at the intermediate direct and general support and unit levels of maintenance, both in CONUS and overseas. This activity may be in support of contingency operations, an established theater of operations, a deployable unit or command.

RETAIL MAINTENANCE:
UNIT
INTERMEDIATE:
DS
GS

e. Wholesale maintenance is that maintenance activity which is performed above the retail level. The depot level of maintenance performs wholesale maintenance operations. The Army Materiel Command (AMC) is responsible for managing wholesale maintenance management. Its headquarters directs the activities of depots, arsenals, and test facilities used in wholesale maintenance. The AMC major subordinate commands (MSCs) develop, procure, distribute and support Army materiel systems. Organizations outside AMC have wholesale maintenance responsibility for some specialized commodities.

WHOLESALE MAINTENANCE:
MAINTENANCE
ENGINEERING
DEPOT OPERATIONS

1-4. The Wholesale Maintenance Mission

Wholesale maintenance has but one purpose—to sustain combat readiness of US and Allied forces. This purpose is achieved by:

- Providing a system for the maintenance of Army materiel systems.
- Determining where, when, how, why, and by whom maintenance actions must be taken.
- Using maintenance data during system development to lessen the maintenance requirement and after system fielding to improve maintenance performance.
- Conducting depot maintenance.
- Providing maintenance assistance to retail maintenance organizations.

Wholesale maintenance responsibilities are consolidated to take advantage of centralized management, which results in an efficiency of operations.

1-5. Organization for Wholesale Maintenance Management

Army wholesale maintenance addresses the Army maintenance system above the retail level. Whole-

sale maintenance responsibility resides within such Army agencies as:

- The Surgeon General
- The Chief of Engineers
- DA Deputy Chief of Staff for Logistics (DCSLOG)
- US Army Materiel Command (AMC)

a. The Army Materiel Command (AMC). The AMC is a major Army command (MACOM). It has materiel life-cycle responsibility. Functions of AMC include formulating the materiel portions of the DA program and executing approved programs, providing integrated commodity management comprising:

- Research, development, and modification.
- Development testing and evaluation.
- Maintenance support planning, including personnel, training, manuals, repair parts, tools, test equipment, and modifications or product improvements.
- Technical and engineering supervision and services, including technical advisory service, product engineering, production engineering, maintenance engineering, and human factors engineering.
- Army provisioning technical and functional policy and implementation for initial and follow-on support.
- Product assurance.
- Value engineering.
- Procurement and production.
- Integrated materiel inventory management.
- Materiel and industrial mobilization planning, contingency planning, and maintenance of mobilization reserves and production base.
- Management of the DA equipment publications program and preparation or acquisition of equipment publications.
- Technical direction and management of the depot maintenance programs.
- Transportation, transportability, and transportation engineering.
- Development and recommendation to Headquarters, Department of the Army (HQDA) of new and improved concepts, maintenance doctrine, and procedures for wholesale logistics operations.
- Management and control of working capital funds.
- Development of automated wholesale logistics systems that interface with Army and other retail logistics systems as well as other DOD wholesale systems.
- Conduct of specialized training of personnel in the materiel area, to include new equipment training (NET).
- Manage central data management program for equipment warranties.
- Management of the AMC portion of the Army-Wide Training Literature Program (ATLP); i.e., preparation of Army Wholesale Logistics Literature (AWLL).

b. Organization of AMC. AMC is comprised of the headquarters, its MSCs, and various other activities and installations.

(1) AMC has assigned materiel readiness responsibility to designated MSCs under its control. These designated MSCs are responsible for the integrated management of their commodities. Integrated management includes:

- Research
- Development
- Design
- Modification
- Sponsorship of tests and evaluation
- Initial repair parts planning
- Tools, test equipment and handling equipment planning
- Technical and engineering supervision and services
- Product engineering
- Production engineering
- Cataloging and standardization
- Direction of procurement and production
- Packaging, handling, storage and transportation
- Readiness
- Materiel inventory management
- Mobilization planning
- Production base planning
- Preparation of equipment publications
- New equipment training
- Army warranty program

(2) The major subordinate commands include:

- US Army Armament, Munitions and Chemical Command (AMCCOM)—armament systems and ammunition (Rock Island, IL).
- US Army Aviation Systems Command (AVSCOM—aircraft (St. Louis, MO).
- US Army Communications-Electronics Command (CECOM)—communications-electronics systems (FT. Monmouth, NJ).
- US Army Missile Command (MICOM)—missiles, rockets, and lasers (Redstone Arsenal, AL).
- US Army Tank-Automotive Command (TACOM)—tracked and wheeled combat, tactical, and general-purpose vehicles, selected construction and materiels handling equipment (Warren, MI).
- US Army Troop Support Command (TROSCOM)—field support items, amphibious ve-

hicles, watercraft, and related railroad equipment (St. Louis, MO).

- US Army Deport System Command (DESCOM)—manages all Army supply and maintenance depots (Chambersburg, PA).
- US Army Laboratory Command (LABCOM)—manages the corporate research and development laboratories and provides intensive integrated management of the entire AMC technology base (Adelphi, MD).
- US Army Test & Evaluation Command (TECOM)—conducts all developmental testing and evaluation of Army weapons and equipment (Aberdeen Proving Ground, MD).
- US Army Security Affairs Command (USASAC)—supports America's security interests and those of its allies through international defense cooperation programs involving hardware, training, and publications. It also manages DOD's participation in selected NATO programs (Alexandria, VA).

c. MSC Organization for Maintenance.

(1) *General.* The organization of a particular MSC within AMC is somewhat dependent upon the peculiarities of the support structure of the assigned commodity. The following are the functional elements common to MSCs regardless of commodity:

- Maintenance
- Materiel Management
- Procurement and Production
- Project Managers
- Special Staff
- International Logistics
- Resources Management
- Product Assurance
- Personnel Training and Force Development
- Plans and Systems Analysis
- Management Information Systems
- Field/Liaison Services
- Readiness

The coordination of the above elements is critical. With respect to maintenance, the MSCs have two directors who coordinate and supervise the majority of maintenance engineering and depot maintenance operations. They are the Director for Maintenance, responsible for the National Maintenance Point (NMP), and the Director for Materiel Management, responsible for the National Inventory Control Point (NICP).

(2) *Scope of NMP Opeations.* The NMP plays a vital role in system/item development and operation. Through maintenance engineering, design characteristics and support concepts are built into a new system. The NMP contines to track the system throughout its life-cycle, gathering operational performance data and modifying system support (or coordinating with the system engineer to modify the system) as needed. The NMP is the key to the success of the AMC Maintenance Management Program. Its activities are influenced to a considerable degree by the requirements of the NICP which is responsible for the inventory management of the system. Inventory management includes the procuring, stocking, and issuing of system/item/component and repair parts/tools/test equipment to support the maintenance requirements of the system and includes programming the worldwide depot maintenance support requirements. The NMP has worldwide technical maintenance responsibility for a specific commodity or group of commodities (items of similar characteristic; e.g., communications equipment, vehicles, aircraft, etc.). Additionally, the NMP is responsible for providing Army depots with technical working-level direction relative to the maintenance support required for its commodity group. The scope of the maintenance management responsibilities of the NMP extends from the early conceptual stages of materiel acquisition through the design, development, procurement, production, use, and disposal stages. Specifically, the major functions of an NMP are in the areas of maintenance engineering, supoort planning, publications, and technical assistance (when required). The responsibilities of the NMP for the particular item or commodity continue throughout its life cycle. The operations of the NMP and the NICP must be closely coordinated to ensure adequate technical and administrative resources required to meet the needs of the equipment user and maintenance support elements are available. Appropriate NMP's may be identified by end item NSN as listed in AR 750-1, appendix C.

(3) *Single Manager for Conventional Ammunition (SMCA).* AMCCOM is responsible for DOD-wide maintenance of conventional ammunition as the Single Manager for Conventional Ammunition (SMCA). The AMCCOM Defense Ammunition Directorate serves as the National Inventory Control Point (NICP) and the National Maintenance Point (NMP) for Army and SMCA conventional ammunition, lethal toxic chemical ammunition, and ammunition peculiar equipment (APE). the SMCA depot level maintenance program for conventional ammunition at US Army Depot System Command, AMCCOM, and OCONUS installations in managed within each activity by a Defense Ammunition Directorate.

d. US Army Deport System Command (DESCOM). DESCOM is responsible for the command and control of assigned US Army depots and depot activities. Depot missions are receipt, storage, issue and maintenance of assigned commodities. Except for the SMCA depot-level maintenance managed worldwide by AMCCOM, DESCOM manages the use of funds, manpower, physical plants and equipment required for depot maintenance worldwide. The information needed to manage depot maintenance operations is consolidated in a DESCOM data bank. This data bank is a source of data for reports to higher headquarters. Chapter 4, Wholesale Maintenance Operations, provides detailed information on missions and locations of depots and depot activities.

CHAPTER 2

PLANNING FOR WHOLESALE MAINTENANCE SUPPORT

2-1. General

The maintenance plan is a description of the requirements and tasks to be accomplished for achieving, restoring, or maintaining the operational capability of a system, equipment, or facility. The maintenance support plan is normally a part of the Integrated Logistic Support Plan (ILSP). Maintenance plans provide many necessary components which make military operations successful. Maintenance requirements are influenced by the threat, the operational plans, and the requirements of the other functions of logistics.

MAINTENANCE SUPPORT PLANNING IS A KEY TO SUCCESSFUL MILITARY OPERATIONS.

2-2. Industrial Preparedness

a. Industrial preparedness denotes an ability to manufacture or maintain materiel in an industrial facility, whether the facility is commercial or Government owned (organic). The Army is concerned both with the production capacity of commercial sources and their capacity to perform depot maintenance during and after mobilization. The maintenance capacity of organic depots, on the other hand, is used primarily for maintenance and not for manufacture. Depots manufacture components or parts that are not readily available from manufacturers to meet overhaul schedules.

b. The intent of industrial preparedness is to provide industrial capability and capacity sufficient to sustain varying levels of combat, including full-scale war, without duplication of facilities or excess capacity. Both commercial and Government owned sources are appropriate for use during and after mobilization to provide adequate capacity to supply the needed materiel. Organic capability is often established to ensure the Army possesses the quality of technical information and experience necessary to maintain and operate a particular item. Organic capacity seldom exists, however, to perform the volume of work which will be required for mobilization. Though organic facilities will expand their capacity to meet urgent requirements, commercial facilities will still be required.

c. Industrial preparedness is concerned with the existence of a readily available capability for industrial operations. This is particularly crucial, as there is not sufficient time to establish new industrial capabilities upon mobilization. The extent to which mobilization increases the industrial requirement is dependent upon several factors:

- Intensity and longevity of combat.
- Degree to which the inventory is stocked.
- Mortality rates of various items of equipment.

INDUSTRIAL PREPAREDNESS IS CRUCIAL TO MILITARY READINESS.

2-3. Depot Maintenance Mobilization Plans

AMC MSCs determine the depot maintenance mobilization requirements for combat essential items. These requirements are provided to DESCOM, who assigns the work to the appropriate depots. The depots analyze the plans and notify DESCOM of any requirements which cannot be accommodated. These excess requirements are reported to the appropriate MSC, with information copy to AMC, for inclusion in commercial industry's mobilization requirements.

2-4. Interservice Support

Wholesale interservice support includes all wholesale actions which result in the provision of materiel, facilities, or services between military services or between a military service and a Federal department or agency. This support may be the result of formal agreement, such as a depot maintenance interservice support agreement (DMISA), or it may be more informally established, as by a memorandum of understanding (MOU). Interservice support makes available to a service which is a minority user of an item the advantages inherent in the logistics system of the service who happens to be the majority user of the item, thereby reducing equipment downtime, logistics pipeline inventories, and investment and operating costs. Any

Army equipment common to another service should be considered for interservice support to the extent that an organic Army capability and capacity are not required. The criteria for selection of a service depot for maintenance are capability, capacity, and economy. An item used by one service may be maintained by another service.

2-5. Host Nation Support

Host nation support is a support arrangement in which the military and industrial forces of one nation support the military operations of another. This support can be of utmost importance to the wholesale maintenance planner if carefully planned and agreed upon in advance. Its use in maintaining common equipment or in providing other readily available support releases organic resources to perform other tasks. It tends to increase the amount of wholesale support and intermediate GS level maintenance available for supporting the combat forces. Plans to use host nation support are successful in contributing to materiel readiness when they take into account the realities of war's effects upon a host nation's ability to provide assistance. Such planning must consider the stability of the host nation, nature of the threat, and availability of other sources of maintenance support.

HOST NATION SUPPORT IS VITAL TO THE WHOLESALE MAINTENANCE PLANNER.

2-6. Contract Maintenance

a. Contract maintenance is the maintenance activity performed under contract by commercial organizations on either a one-time or continuing basis. It provides an effective means for augmenting the Army's resources in accomplishing materiel maintenance. This does not mean that contract maintenance is a substitute for bad planning; on the contrary, it can only be helpful if it is preceded by, and implemented with, effective logistics planning. A contractor requires the same resources as an organic Army facility, to include tools, repair parts, facilities, plant equipment, qualified personnel, and sufficient time to plan required maintenance operations. Contract maintenance is a necessary component of industrial preparedness, and must be planned and employed in a manner which will be effective under wartime or emergency conditions. Contract maintenance may be performed by a contractor using government-owned contractor-operated (GOCO) or contractor-owned contractor-operated (COCO) facilities.

b. The MSCs are responsible for planning and awarding contracts for depot maintenance. They are also responsible, in coordination with DESCOM, for ensuring obligations and contract completions are performed on a timely basis.

2-7. Automation

a. Increasing use is being made of automatic data processing (ADP) techniques in managing and operating the Army's maintenance system. This automation extends much further than merely data processing, however. Automated techniques are being used for communications, printing, training, and the storage and retrieval of information. The impact of automation upon maintenance management is immense. Collection of performance date, determination of requirements, command and control, communications, and financial management are highly dependent on automation. The volume and sophistication of data which are required to manage maintenance preclude manual handling of this information. the use of automation will continue to increase as centralization of management increases and the need to "do more with less" continues.

b. The dependency upon automation demands that ADP and associated communication systems be capable of satisfying the maintenance management requirements during wartime. This requires that the systems be designed to perform as designed during hostilities and be protected from combat damage.

c. ADP systems must be designed to ensure minimum turbulence in the transition from peace to war. To operate in war as we do in peace requires that the user need not learn any new tasks upon mobilization.

d. Maintenance data pertain to the information which a system generates during day-to-day operations. This information, reflected in reports of various types, is used by maintenance managers to determine program performance levels. Management data serve many purposes. When made available on a timely basis, they are indispensable to effective life-cycle management of systems and equipment. These data are required to conceive, define, develop, test, and acquire an item or a system, and to maintain and support it properly. Management data provide maintenance managers with information required to evaluate the readiness availability status of equipment, readiness posture of a unit, adequacy of resources, and cost-effectiveness of maintenance operations. By carefully analyzing management data, maintenance managers are able to isolate problem areas to make adjustment necessary for desired improvements. Analyses of these data enable managers to

appraise current managerial concepts and operating procedures. As a result of this appraisal, the manager may employ modifications of those concepts that are producing the desired level of operational efficiency in other areas.

e. There are two primary standard automated systems developed and implemented by AMC. They are the Commodity Command Standard System (CCSS), which is used by the AMC MSCs to support the NICPs and NMPs, and the Standard Depot System (SDS), which is used to support the Army's depot system. With respect to maintenance, CCSS and SDS provide an automated means to ascertain actual overhaul consumption data to be used by depots in acquiring repair parts. In an effort to eliminate the use of various command-unique maintenance systems, the Standard Army Maintenance System (SAMS) is being implemented. When fully implementd, SAMS will provide an automated, uniform, standard maintenance system that is responsive to each level of command from the user, through the retail and wholesale levels, to the national level. The Maintenance Data Management System (MDMS), a part of SAMS, has been implemented to privide automated control of maintenance. The maintenance module of the Defense Standard Ammunition Computer System (DSACS) will utilize MDMS to manage SMCA conventional ammunition maintenance.

2-8. Supply Relationships

The maintenance and supply systems are closely linked, since the output of one affects the other. All levels of maintenance are customers of the supply system. Also, all levels of maintenance place materiel back into the hands of the user. At the wholesale level, maintenance is considered a source of supply.

a. Repair parts. The NMP responsible for an item predicts requirements for repair parts. Using those predictions, the NICP plans to make parts available.

(1) *Retail.* Recommended initial repair parts stockages are established based on provisioning data developed during Logistics Support Analysis (LSA) on new equipment. Data generated and based on the maintenance concept, failure factors, essentiality, or safety factors are used to establish recommended supply list allowance card (SLAC) decks which propose stockage at prescribed load lists (PPL) and authorized stockage lists (ASL) levels. The gaining commander and MSC negotiate the specific items and quantity of each to be included on the SLAC. The PLLs and ASLs are critical in supporting the maintenance mission to provide materiel readiness. A sufficient quantity must be stocked to be compatible with resupply operations, but it must not limit the unit's mobility or otherwise interfere with performance of the mission.

(2) *Wholesale.* The NICP supplies repair parts for depot maintenance based upon historical usage data and engineering data developed by the NMP.

b. War Reserves. War reserves provide the interim support essential to sustain operations until industry can meet all post D-day consumption. War reserves are used for:

- Fill of post D-day combat consumption requirements.
- Replacement of mobilization training losses.
- Issue to mobilization units.
- Support of allied nations through security assistance.

c. Pre-positioning of Materiel Configured to Unit Sets (POMCUS). POMCUS is a set of equipment stored in the theater in the proper quantities for immediate issue to a particular deployable unit. It differs from normal theater war reserves in that POMCUS stores the unit's equipment in one location; war reserves are generally stored by commodity, rather than by unit. POMCUS stocks are intended to be maintained to ready to issue status, thus achieving a high degree of readiness. This is crucial in today's "come as you are" environment.

d. Direct Support System (DSS).

(1) The DDS in an area-oriented depot to the intermediate general support unit/direct support unit (GSU/DSU) supply system. It uses high-speed communication and air and sea shipments direct from designated Continental United States (CONUS) area-oriented depots to an intermediate GSU/DSU overseas. DDS in wartime is restricted to air lines of communication (ALOC) class IX supply (repair parts) and selected class II items (maintenance related tools and equipment). Broad objectives of DSS are to increase supply efficiency, responsiveness, and asset visibility while decreasing inventories and time lags in the supply pipeline. Specific objectives of DSS are:

- More efficient use of resources.
- Improvement of requisition response time by reducing order shiptime (OST).
- Reduction of inventories without degradation of materiel readiness.
- In-transit asset visibility and control.
- More efficient use of communication and transportation techniques.
- Containerization of materiel for shipment.

• Reduction of stockage vulnerability in theater to air or nuclear attack.

(2) Although some oversea inactive depot stockage is retained (war reserve, safety level, and operational project stocks), most support unit supply requirements are met by direct delivery from CONUS depots, bypassing oversea theater depots and break bulk points.

e. Reparable Exchange (RX).

(1) RX is the exchange of a serviceable reparable module (from the RX activity) for an unserviceable reparable one (from the user). Such a module is an item assembly, subassembly, board/card, or component designated as a single unit to facilitate and simplify production line techniques, transportation, supply, and maintenance. A standardized RX system establishes Army-wide policy guidance and management techniques for those supply and maintenance actions essential in the execution of the RX program for reparable/recoverable modules in an efficient, responsive and cost-effective manner.

(2) RX procedures allow a user to obtain serviceable modules from a supporting RX activity with minimum paperwork and administrative burden; this, in turn, frees the user from detailed piece-part repairs and excessive parts stockage.

(3) The objectives of RX include:

• Improve operational readiness.

• Establish a standardized system integrated into the Army supply system which incorporates simplified administration and accounting, based on a one-for-one exchange.

• Provide one-stop support for all RX modules.

• Establish mandatory stockage levels of essential RX modules at each RX point and supported organizations.

• Obtain total asset visibility of both unserviceable and serviceable recoverable modules onhand from intermediate DS to wholesale logistics levels.

• Provide for a single issue system for recoverable coded materiel in each exchange loop.

• Establish RX loops between users and supporting intermediate (DS and GS) maintenance units.

(4) IDS, IGS, and theater levels for reparable assets for newly fielded equipment will be established by the wholesale manager for each fielded system.

f. Maintenance Floats. Float is a quantity of selected items of equipment authorized to replace like items evacuated for maintenance. One primary purpose of the float is to maintain the operational readiness of supported units. There are two types of float: repair cycle float (RCF) and operational readiness float (ORF).

(1) RCF is a quantity of items authorized for stockage at the wholesale level of the supply system. It is used to replace items undergoing scheduled depot maintenance.

(2) ORF is a controlled quantity of selected items of equipment authorized for stockage at the intermediate (DS) maintenance level. It is used to replace unserviceable, reparable items in the using units when intermediate (DS) maintenance cannot repair the unserviceable item within specified time limits.

CHAPTER 3

MAINTENANCE ENGINEERING

3-1. Maintenance Engineering During Development

Maintenance engineering during the development of equipment determines where, when, how, why, and by whom maintenance action will be taken to retain equipment in, or restore it to, servicable condition. It develops concepts, criteria, and technical requirements during the development of new items. These are applied during production and deployment for timely, adequate, and economic maintenance support of equipment and systems.

a. Maintenance engineering participates in the planning and development of equipment to minimize the need for maintenance resources. Effective maintenance participation significantly influences design configuration which, in general, dictates support investments and operating costs associated with new equipment. A valuable input to maintenance engineering is historical data on similar items, components, and assemblies. The most valid data are sought from industrial sources, test data, and special reporting systems. These data, properly screened, arranged, and analyzed, provide insight into maintenance requirements and support characteristics expected from the system.

EFFECTIVE MAINTENANCE ENGINEERING CONTRIBUTES TO LOWER-LIFE-CYCLE COST.

b. Information that can be obtained from historical data includes ratio of man-hours to elapsed maintenance time, ratio of maintenance time to operating time, man-hour utilization by skill and maintenance level, and computation of the mean and variance for maintenance man-hours. Analysis of these data may indicate the need for actions to improve supportability of a like item under development. Such actions may take the form of incorporating design changes or support constraints, establishing different support procedures, reducing or increasing the scheduled maintenance and inspection requirements, and changing requirements for personnel, tools, and test equipment in malfunction diagnosis, troubleshooting, and repair procedures.

c. Maintenance is involved early in the process of development, specifying criteria by which both logistics and support considerations will affect design and configuration of a new item.

MAINTENANCE ENGINEERING=DESIGN INFLUENCE

(1) The technical, military, and economic bases, and the overall feasibility of the development concept are established through comprehensive studies which are performed by various activities. Proper testing procedures are developed as a result of the identification of critical, technical, and operational issues.

(2) Interfaces between the developing system and other systems, whether existing or planned, are defined while support equipment requirements are identified. Quantitative and qualitative requirements for items are determined, and the means for adding the materiel to the Army inventory are considered.

(3) Systems must be maintainable under combat conditions. Maintenance engineering predicts battle damage failures of system components. This information is used to estimate wartime repair part requirements and to identify those maintenance actions required in wartime. Through the Battlefield Damage Assessment and Repair (BDAR) Program, special repair procedures are developed which allow a damaged system to be returned to combat.

SYSTEMS MUST BE DESIGNED FOR BATTLEFIELD REPAIR.

d. The maintenance engineering effort during materiel development is concerned with designing equipment which is easily maintained. This effort is complicated by the related support elements which must be fully considered. The overall development of the various support elements is accomplished through an Integrated Logistic Support (ILS) program which includes:

- Design influence.
- Maintenance planning.
- Manpower and personnel.
- Supply support.
- Support equipment and test, measurement, and diagnostic equipment (TMDE).
- Training and training devices.
- Technical data.
- Computer resources support.
- Packaging, handling, storage.
- Transportation and transportability.
- Facilities.
- Standardization and interoperability.

e. Maintenance engineering impacts on each of these elements, and, in fact, the ILS process advocates that maintenance engineering become the "motivator" or "integrator" of all support elements. A close coordination must exist between maintenance engineering and contractors submitting proposals for production of the equipment. In many instances, contractors may propose support concepts for consideration that differ significantly. After these proposals have been evaluated, a final production contractor is selected, establishing the framework for fully developing all maintenance support elements and the interfaces with other logistics functions.

TESTING IN THE MISSION ENVIRONMENT IS CRITICAL TO EFFECTIVE MAINTENANCE SUPPORT.

f. Logistics Support Analysis (LSA) is a principal tool in implementing ILS. The LSA process provides the logistics manager with the information necessary to integrate logistics considerations into the design effort and to ensure all elements of the logistics support system are planned, acquired, tested, and deployed. LSA is the set of systematic and comprehensive analyses which serve to identify support criteria and support system requirements. These represent a composite of many technologies (design, reliability, maintainability, system engineering, etc.) used in the definition of support requirements and the injection of support criteria into the acquisition process. These analyses represent the single logistics analytical effort and serve as the interface between materiel design and support planning. When the LSA is implemented, actions are taken to identify, define, analyze, quantify, and process logistics support requirements. This analysis process evolves as the acquisition program progresses. The number and type of iterative analyses vary according to the program schedule and complexity.

g. Operational readiness, maintainability, and reliability are engineering design requirements. Engineering ensures the development of data which lead to a proper balance between costs, system performance, and support. Reviews and tests provide feedback concerning required changes in design which, in turn, must be analyzed and incorporated into the hardware. Any corrective engineering measures uncovered must be applied as quickly as possible, and the effectiveness of the improvement must be tested, ensuring maintenance requirements are met and improvement is achieved through reduced failure rates, increased operational readiness, or a related gain. The maintenance engineer is primarily concerned with minimizing later maintenance activity, incorporating the most reliable components, modular construction, and built-in test indicators. His aim is to achieve a design which will eliminate or minimize any deficiency that prejudices ease of maintenance.

OPERATIONAL READINESS, MAINTAINABILITY, AND RELIABILITY ARE ENGINEERING DESIGN REQUIREMENTS.

h. An analysis of all the maintenance tasks which can be performed on an item precedes the allocation of those tasks to the appropriate level of maintenance. The analysis addresses the time required to perform specific maintenance tasks; determines the skills required to perform the tasks; and identifies the facilities, equipment, and repair parts required. The resulting maintenance task allocation must be made known to personnel having maintenance, supply, and support responsibility. This allows the support rationale of the development phase to be implemented in the operational phase.

MAINTENANCE TASK ANALYSIS IS THE *HOW* and *WHAT*.

i. The Maintenance Allocation Chart (MAC), or maintenance task matrix for some aircraft, embodies the maintenance concept developed by maintenance engineering for a given system. For each component and assembly of the end item, the MAC identifies the maintenance operations that can be performed and assigns those operations to the appropriate level of maintenance. It lists time standards for each maintenance function, as well as the tools and test and support equipment needed to perform the function. The MAC is in the technical manual containing organizational maintenance instructions. The repair parts and special tools required to perform the maintenance func-

tions, as identified in the MAC, are contained in the Repair Parts and Special Tools List (RPSTL), another maintenance engineering publication for the system. The MAC and the RPSTL impact significantly on the supply and maintenance function, as they serve as the starting point for the selection of repair parts and stockage of those parts at the appropriate levels of maintenance.

MAINTENANCE ALLOCATION IS THE *WHO* and *WHERE*.

3-2. Materiel Fielding

Service to the field is based on timely and effective development of an end item for total package fielding (including all component major items and basic items) and a complete support package. Failure to consider even one minor component of a system may cause delay in fielding until proper fabrication, test, and installation can be completed. It is essential to first determine that a positive, supportable design that is economically feasible and technically supportable can be developed.

a. General. Materiel fielding consists of that portion of the Life-Cycle Management Model (LCMM) which prepares for placement of new equipment and systems in the field. The actions completed during the earlier phases of the LCMM were designed to simplify this process. Materiel fielding documentation necessary for successful fielding includes:

- Army Modernization Information Memorandum (AMIM).
- Modernization Resource Information Submission (MRIS).
- Force Modernization Master Plan (FMMP).
- MFP Letter of Notification (LON).
- Materiel Fielding Plan (MFP).
- Mission Support Plan (MSP).
- Materiel Fielding Agreement (MFA).
- Special Support Services (to include Materiel Fielding Team).
- Transportability Approval (TRAP).
- "Materiel Release."
- Maintenance Publications.
- Operator Manuals.
- Supply Publications.
- Technical Bulletins.
- Repair Parts Stockage Recommendations.

The materiel developer is required to prepare a Materiel Release Statement certifying that the new system can be supported and is ready for fielding.

b. New Equipment Training (NET).

(1) Planning for NET occurs as early as possible in the development process, since NET is an essential link between the materiel developer and the users of the new equipment. The objective of this early planning and programing is to ensure trained personnel are available for testing and evaluation efforts and qualified personnel are available to the using units concurrent with the fielding of the hardware. The materiel developer develops a training program designed to qualify an instructor cadre team in the operation and maintenance of the new item or system. This cadre, in turn, trains additional instructor personnel who will constitute the training base for resident training in the US Army Training and Doctrine Command (TRADOC) schools system. Thus, skills obtained and developed in the wholesale community are passed on to the retail community in time to train the ultimate user concurrent with receipt of hardware. Frequently, the timing of new equipment deployment is such that the TRADOC schools are unable to have trained people on hand in using units when new equipment arrives. When this situation occurs, a New Equipment Training Team (NETT) is sent to the field to train the receiving units in the operation, maintenance, and mission-employment of the equipment. The goal of such training, although not MOS-producing, is to develop proficient users and support personnel who are capable of operating and maintaining deployed items or systems at full operational capability.

NEW EQUIPMENT TRAINING IS THE LINK BETWEEN DEVELOPER AND USER.

(2) The NET Plan will also contain provisions for training depot maintenance personnel, when required. Normally this training will be conducted by the manufacturer of the system.

(3) While NET is normally associated with new equipment, training may be required for equipment redistributed as a result of product improvement or the application of Modification Work Orders (MWO).

3-3. Maintenance Engineering After System Deployment

Effective controls must be established and maintained to minimize deterioration of reliability, availability, and maintainability (RAM) during

supply and maintenance activities and operational use. The operational phase also creates technical knowledge for resolving problems and for product improvement. The following elements must be executed:

- Effective collection, analysis, and follow-up of defective parts replacement data. Timely identification and resolution of problems, to include product improvements, is the objective of this effort.
- Effective controls over parts substitution during maintenance operations.
- Periodic stockpile reliability evaluation of selected items.
- Evaluation of the effects of repetitive maintenance.
- Effective program to control application of approved modifications.
- Continuous or periodic assessment of RAM characteristics based on operational use data.

MAINTENANCE ENGINEERING ACTIVITY EXTENDS INTO THE OPERATIONAL PHASE OF A SYSTEM'S LIFE CYCLE.

3-4. Performance Data

Data feedback from the field is generated and reported to continuously monitor and evaluate a deployed item or system.

a. Data are gathered worldwide, examined, and evaluated using statistical methods. One method of generating maintenance data is sample data collection (SDC). During system development, an SDC plan is considered for each new or modified system. Uses of resulting data include evaluation of equipment failure frequency and cause, failure trends, and time required for repairs. These data relate to the RAM studies of earlier phases and are useful in developing repair standards and in forecasting repair parts, labor, and total maintenance effort requirements. Economic studies may be made to compare actual field results against projected goals. They are also used in determining whether to repair or purchase a replacement item. Such economic comparisons are of value in developing future similar systems. Area density and usage reports are used to assist in forecasting depot overhaul requirements.

b. The Manpower Requirements Criteria (MARC) Program (AR 570-2) prescribes procedures and quantitative data for determining minimum essential personnel position requirements for Combat Support and Combat Service Support functions in TOE units. This manpower data is developed from historical data or through a system-designated SDC program or general field data collection effort.

c. Of particular importance to maintenance management are the various usage and maintenance data generated under the reporting procedures of The Army Maintenance Management System (TAMMS). The uses of TAMMS data include:

- Assess performance of new equipment in terms of reliability and maintainability.
- Evaluate effectiveness of maintenance support and adequacy of resources allocated for maintenance.
- Ensure configuration control.

TAMMS data provide input for managing the maintenance aspects of a deployed item or system throughout useful service life. In fact, these data may be essential in determining when useful service life has ended from a cost of maintenance point of view. Collection and analysis of RAM data are essential elements in evaluating maintenance performance.

d. Data feedback from field commands provides an essential element for management of an item or system throughout its useful life. Decisions to modify, change, improve, or dispose of an item or system require such feedback for effective monitoring and evaluation from production to disposal. Feedback from the field is of value not only to trigger changes and improvement in hardware and operational concepts, but also in evaluating other aspects of the total system such as training, doctrinal, and technical literature; basis of issue (BOI) plans; Tables of Organization and Equipment (TOE); and training programs at all levels.

3-5. Equipment Improvement Recommendations (EIR)

EIRs are provided by users to the NMP having responsibility for the equipment. Prompt action by the NMP is evidence that the information provided by users is important to the correction of failures, deficiencies and shortcomings as well as to the development of new systems, the ongoing analysis of existing systems and the sustainment of materiel readiness.

a. The EIR is a means for the user to propose changes to equipment which will improve its operability. Since the majority of the experience with equipment resides with the user, this represents a well-recognized source of recommended improvements.

b. The EIR is feedback data on equipment which has experienced failures, deficiencies and shortcomings due to faults in design, operations and/or manufacture. The faults may cause partial or total failure during field use. Users report these deficiencies to obtain corrective action on the reported materiel. This report initiates the purging of similar deficient materiel from the supply system and enables corrective action to preclude recurrence of the identified deficiencies. EIRs ensure actual experience is incorporated into research, design, development, and production efforts on new equipment to provide more realistic determinations of component replacement rates, repair cycle time, maintenance float requirements, maintenance and supply problems by geographical areas, and repair parts stockage levels. Because of the relationship of high equipment readiness and the readiness posture of a unit, EIRs are reviewed, analyzed, and acted upon without delay.

3-6. Logistics Assistance

a. Logistics assistance is a field service provided to military equipment users/support personnel on a world-wide basis by experienced and technically trained supply and maintenance personnel. Although field commanders at all levels are responsible for developing an organic capability to perform supply and maintenance functions, much of today's technology demands that highly specialized technical assistance be provided. Assistance in developing this capability or solving problems beyond the control of field commanders is provided either by highly skilled DA civilians, military personnel, or by field service representatives. Logistics assistance programs are controlled and operated on a worldwide basis by elements of the Readiness Directorate of the AMC MSCs. The Readiness Directorate serves as both the focal point for assistance to the field, and as the conduit between the field and other MSC elements for assistance requiring that level of resolution. Hence, the NMP would provide assistance or respond to those inquiries concerning maintenance. (NOTE: The Logistics Assistance function has been transferred from the NMP (Maintenance Directorate) in most MSC's.) It is not uncommon to have facets of a technical assistance program pertaining to newly introduced and highly complex systems operated by the prime contractor under specific terms of the development-production contract. During early development, future requirements for technical assistance personnel, special skills, contractor personnel, training of technicians, and related costs for each materiel approach are identified and carefully evaluated. The logistics assistance program is less likely to affect concept selection than are some of the other support elements. However, it is a major support element and can have a significant effect on total life-cycle costs. Logistics assistance is normally applied during the operations phase of the system life cycle. System support managers provide such assistance to support international logistics obligations by contract or through in-house capability, depending on scope or requirement, degree of urgency, and capability of providing needed personnel.

b. The Readiness Directorate (NMP for nuclear) maintains expertise at designated commands which provides a central inquiry bank for logistics support matters relative to fielded systems. These activities serve as the highest level of expertise available to provide logistics assistance to installations and organizations in CONUS and overseas. Through direct communication with the user or maintenance activities at the lowest level, extensive pinpoint assistance can be provided as well as accumulation of data which results in product improvement. The NMP will provide assistance, when that level of resolution is required, to include on-site assistance.

CHAPTER 4

WHOLESALE MAINTENANCE OPERATIONS

4-1. General

Wholesale maintenance operations possess the most sophisticated maintenance capabilities available to the Army. Most wholesale operations are conducted in fixed facilities, using complex skills in an industrial environment, but, when required, provide maintenance support onsite to the retail system.

4-2. Depot Maintenance Operations

Depot maintenance operations support the overall DA inventory management program. They are used as an alternative or supplement to new procurement as a source of serviceable materiel to meet DA materiel requirements. Programs for the depot maintenance of materiel, except those for the repair and return to user of equipment of the Reserve Components, are approved by HQDA and controlled by national level materiel managers under the monitorship of the DCSLOG. The Reserve Components' repair-and-return-to-user depot maintenance program is controlled by OCAR and ANG; and coordinated with FORSCOM, AMC and DCSLOG, DA. Approved depot maintenance programs are executed by designated Army facilities, by agreement with other military services, and by contractual arrangements with commercial firms.

THE DEPOT SYSTEM IS A "WARM BASE" FROM WHICH TO MOBILIZE THE ARMY'S RESOURCES TO SUPPORT THE NATIONAL DEFENSE.

4-3. Elements of Depot Maintenance

Depot-level maintenance requires more extensive shop facilities, more specialized equipment, and more highly skilled personnel than those required by lower levels of maintenance. Depot maintenance requires the following elements:

a. Unserviceable Materiel. Unserviceables are generated rapidly in the early days of war; they must be overhauled by depot maintenance and returned to combat quickly to ensure supply availability. Close coordination must be performed with supply and transportation to reduce time lost to transportation and handling.

b. Repair Parts. Depot maintenance operations routinely consume large quantities of repair parts. Provisioning and forecasting for this consumption must take into account wartime consumption rates.

c. Obligational Authority. Authority to expend funds is used as a control mechanism and ensures that scarce financial resources are used in a method which improves readiness.

d. Tools, Test Equipment, Facilities, Manpower, and Technical Documentation. These resources provide a depot facility with the capability to refurbish an item of equipment. Their necessity is foreseen and planned for in advance of the date they are needed to support the equipment.

4-4. Organic Facilities

Army facilities which perform wholesale maintenance are generally depots, arsenals, and ammunition plants (figures 4-1 and 4-2). Depots have the most all-encompassing responsibility for wholesale maintenance operations; arsenals and ammunition plants have a large mission to manufacture weapons and ammunition, respectively, and a more limited mission to perform maintenance of items for which their special capabilities are needed.

a. Expansion. Organic facilities are retained in such a state as to allow expansion of capability and capacity during national emergency. Capacity is increased by working longer or additional shifts and hiring additional personnel. Capability may also be increased by acquiring additional personnel, but the availability of certain skills may be severely limited. Since defense contractors will be attempting to hire similar skills at the same time, competition for personnel will be severe.

(1) *Augmentation of Depot Work Force.* Wholesale maintenance relies on National Guard and Army Reserve units to support the depot maintenance mission. Trained units and individual personnel are employed to augment the depot maintenance work forces as soon as possible during mobilization.

(2) *Limiting factors in expansion.* Limited facilities, tools, and test equipment will cause delays

in increasing the Army's industrial strength during mobilization. Plant equipment or other equipment stored as war reserve will be used as required, but many items will not be obtainable for months or years, under the best conditions.

(3) *Aviation Classification Repair Activity Depots (AVCRAD).* A form of expansion of depot maintenance is the planned use of aviation classification repair activity depots to classify and repair specified aviation equipment for rapid turnaround to the troops in forward positions.

b. Army Materiel Command (AMC) Support to Mobilized Forces.

(1) During the early stages of a contingency, forces supported by Pre-positioned Materiel Configured to Unit Sets (POMCUS) depart the Conus and are transported to the sites of their respective equipment. Selected forces then mobilize at predetermined locations throughout CONUS and are outfitted with the equipment remaining after departure of the POMCUS units. This equipment, called POMCUS Unit Residual Equipment (PURE), must be made ready for deployment as rapidly as possible. The installation maintenance activity provides a concerted effort to perform the maintenance required to make equipment combat ready. Expeditious supply support to such mobilization centers is provided by the AMC.

(2) While it is not anticipated that extensive depot level maintenance will be accomplished, an assessment of component repair at the depot level is required in order that contingency plans may be developed to ensure depot facilities can be activated on short notice. This capability, coupled with the technical assistance available from the depot level, will expedite mobilized units achieving the desired state of readiness for deployment.

4-5. Contractor Facilities

a. General. Just as the wholesale system relies on civilian industry for procurement of new items, the resources of industry are also available for maintenance contacts. It is the policy of the Government to rely on the free competitive private enterprise system for required products or services to the maximum practicable extent. Only under certain circumstances will the Government obtain its products or services from organic sources. The reasons for this policy are well established; local and national economies are influenced by Government facilities displacing private industry. A healthy private industrial base is important for economic reasons, but more importantly, it represents a key source of industrial capability. DA does not intend to provide organic capacity to perform all the wartime workload. On the contrary, the intent is to provide whatever capability is required, organic or contract, to complete the wartime requirement. Organic depot maintenance capability and capacity are established and sustained on the basis of workloads generated by weapon systems and equipment that are essential to the accomplishment of the Army's mission.

b. Uses for Contract Maintainance. Contract depot maintenance is used in the following situations:

- Depot maintenance requirements exceed the military capability and capacity retained to support mission-essential materiel.
- Depot maintenance is required for support of commercial equipment and nontactical elements. This is true only if performance of such work is not required for military effectiveness, personnel training, or rotation and career development of Army personnel.
- Interim contractor support is required to provide a smooth transition to the acquisition of an organic support capability.

4-6. Depot Maintenance Performed

a. Overhaul is the highest level of maintenance normally performed on Army equipment. It is accomplished based upon specific criteria, detailed in a written document, which is usually a Depot Maintenance Work Requirement (DMWR). Overhaul returns an unserviceable item to a completely serviceable condition but, in most cases, not a "like new" condition. Overhaul may be performed less frequently in wartime than peacetime due to the urgency of returning materiel to battle in the most expeditious manner. This possibility is dependent upon how urgently the item is needed in the combat area, estimated time to overhaul, and the probability that a lesser degree of maintenance will be effective in keeping the item in service.

b. Rebuild is action taken to restore equipment to the original manufacturer's specifications. It exceeds overhaul in complexity and expense, but does not necessarily offer greater reliability characteristics than overhaul. Therefore, even though the ability to perform rebuild may exist, it is not normally utilized. In certain situations, however, rebuild may be prudent for other reasons such as safety in the case of medical materiel. Rebuild can be performed only upon authorization by DA DCSLOG.

c. Conversion is the alteration of the basic characteristics of an item to such an extent as to change its mission and performance capability and to result in a change in model designation. Per-

formance of conversions will be curtailed during wartime and limited to those extremely urgent conversions which are immediately necessary for improving the fighting capability of combat units. Such conversions will be performed whether or not they can be performed in conjunction with overhaul. Most conversions scheduled in peacetime are not urgent to the extent that they are required in wartime.

d. Activation is the depreservation, servicing, inspection, testing, and other related maintenance actions required to return a stored or inactive item to operational use. This operation is of utmost importance during mobilization, as items are removed from storage and issued to mobilizing units or to units experiencing combat losses.

e. Modification is the alteration of an item which does not change the basic characteristics of the item to such an extent as to change its mission or performance capability and to result in a change in model designation as does a conversion. Modifications may be applied during depot overhaul or to equipment in the field by depot teams or contract teams. Only the most critical modifications are considered to warrant the expenditure of resources during wartime. Any modifications deserving attention in wartime must relate directly to a deficient combat capability.

f. Repair is the specified maintenance required to correct materiel damage and to restore an item to required serviceability standards. It includes intermediate (GS) maintenance performed at that level by depot maintenance personnel. During wartime, repair may be performed much more frequently by depot personnel than during peacetime. The requirement to repair equipment quickly and return it to combat sometimes precludes the performance of overhaul, and requires that repair be limited to those repair actions necessary to return the item to combat.

g. Depot maintenance assistance is to the use of qualified depot maintenance personnel to perfom onsite maintenance requiring those skills and items of equipment normally restricted to depot level operations. This is one of the more important roles of depot-level maintenance during the mobilization states of military conflict. Depot level maintenance augments the maintenance capability of the retail system during mobilization in that depot skills and equpment are made available onsite to perform depot level tasks. This assistance is available to all active Army, Reserve, and Army National Guard units which are preparing to fulfill their combat missions.

h. Depot technical assistance is onsite assistance of a technical nature which is limited to providing information, instruction, and guidance. No actual maintenance task is performed by the assisting party.

i. Manufacture is the fabrication of an item by application of labor and/or machines to materiel. Depot capability exists to manufacture many items, mostly repair parts; this capability is restrained during peacetime due to the diseconomy of such operations when compared to private industry and its continuous production lines. During wartime, however, depot fabrication will be used to the maximum extent required for selected parts. This does not eliminate the requirement to plan in advance for sufficient quantities and timely production from private industry. Depot fabrication is not a cure for improper planning, but rather an appropriate source of manufacture under crisis conditions.

j. Reclamation is the authorized processing of items to obtain parts or components that are to be retained in the inventory prior to taking disposal action on the remaining items. Depots take such action after authorization by the NICP of the responsible MSC or other inventory manager. During wartime, reclamation will in some cases be a very important source of repair parts. This includes those cases where nonreparable equipment possesses parts which are urgently needed somewhere in the supply system. Most of such work is performed by the retail maintenance system, but when nonreparable items are inadevertently returned to the depot system, it is performed at that level.

k. Renovation is the test, evaluation, and rework of ammunition and special materiel required to retain desired readiness capability.

4-7. Wholesale Maintenance in the Theater of Operations

a. General. Wholesale maintenance is oriented toward supporting a theater of operations or a contingency force anywhere in the world (figure 4-3). The most immediate assistance required of wholesale maintenance is that supplies by the depot level of maintenance. Depot maintenance has a responsibility to return serviceable items to the wholesale supply system, but in time of war it has an immediate and urgent responsibility to return items quickly to a theater in support of military operations. The necessity of wholesale maintenance operations maintaining a presence in the theater is derived from the nature of today's battlefield. Among the factors influencing the situation are:

° Lack of warning prior to initiation of hostilities.

° Intensity of combat.

° Immediate heavy losses of personnel and materiel.

° Limited inventories of materiel.

° Abundance of combat-essential components not reparable at retail levels.

° Lack of efficiency of retail levels of maintenance caused by the extreme demands of mobility.

b. Relationship Between Wholesale Maintenance Operations and the Theater.

(1) The peacetime existence of wholesale maintenance in the theater must continue in wartime. Transfer of a mission from the wholesaler to the theater during the transition to war or during the early phases of war would not normally occur.

(2) Written agreement must exist between the wholesaler and the theater commander which clearly delineates the functions for which each is responsible. This agreement may be a memorandum of understanding (MOU), memorandum of agreement (MOA), support agreement, any other appropriate agreement, or a combination of these. Agreements include provisions for the mutual support of the wholesaler and the theater in peacetime, transition, and wartime. These include:

° Scope of maintenance to be performed by the wholesaler.

° Identification of the equipment to be maintained.

° Facilities to be provided by the theater.

° Arrangements for all contractor support, whether host nation or United States.

° Responsibility for establishing priorities and directing the distribution of repaired materiel.

° Clear delineation of the responsibility for wholesaler and theater functions.

° Provisions for any other mutual support required during peacetime, transition, and war.

(3) Command, control, and supervision of wholesale personnel, operations, and missions are the responsibility of the wholesaler. The theater commander establishes and prioritizes the requirements, but the how and where of meeting those requirements is the responsibility of the wholesaler. Under certain conditions, however, responsibility for wholesale maintenance is shared with the theater, or in time of sufficient emergency, absorbed entirely by the theater. The circumstances under which command and control of wholesale elements transfer to the theater is delineated via written agreement.

c. Location of Wholesale Maintenance Operations.

(1) A contingency force may have no need for extensive wholesale maintenance outside the CONUS. Wholesale support may be limited to technical assistance or maintenance teams having limited goals and missions of short duration. A fully developed theater, however, may require extensive wholesale support and depot maintenance capability in the communications zone (COMMZ). Wholesale maintenance involving civilians, whether DA, host nation, or contractor, is not deployed forward of the rear corps boundary except for specific missions of limited duration.

(2) Existing sites of wholesale maintenance operations are continued in wartime as long as possible. Alternate sites, preplanned during peacetime, are used when changing wartime conditions so dictate.

(3) Wholesale maintenance operations require protection, as they are a vital element in providing combat sustainability. Provisions must be taken to provide protection, as the fixed facilities are extremely vulnerable to detection and attack. At the discretion of the wholesaler and in coordination with the theater, wholesale facilities may be placed in the COMMZ, offshore, or in a third country.

d. Scope of Depot Maintenance. Depot maintenance performs the minimum maintenance required to make equipment mission capable in wartime.

(1) In wartime, overhaul is not performed to the extent required by a DMWR. A not-mission-capable item is made mission capable, but not necessarily capable to fully perform every element of every mission for which it was designed. In short, long-term reliability of equipment may be sacrificed in favor of short-term operational capability. This entails, however, a need for the wholesaler to identify those maintenance actions which may be neglected or modified under emergency conditions. The extent of overhaul is dictated by the urgency with which equipment is needed in combat. This attitude parallels the concept of applying mission essential maintenance operations (MEMO) to the retail maintenance of materiel.

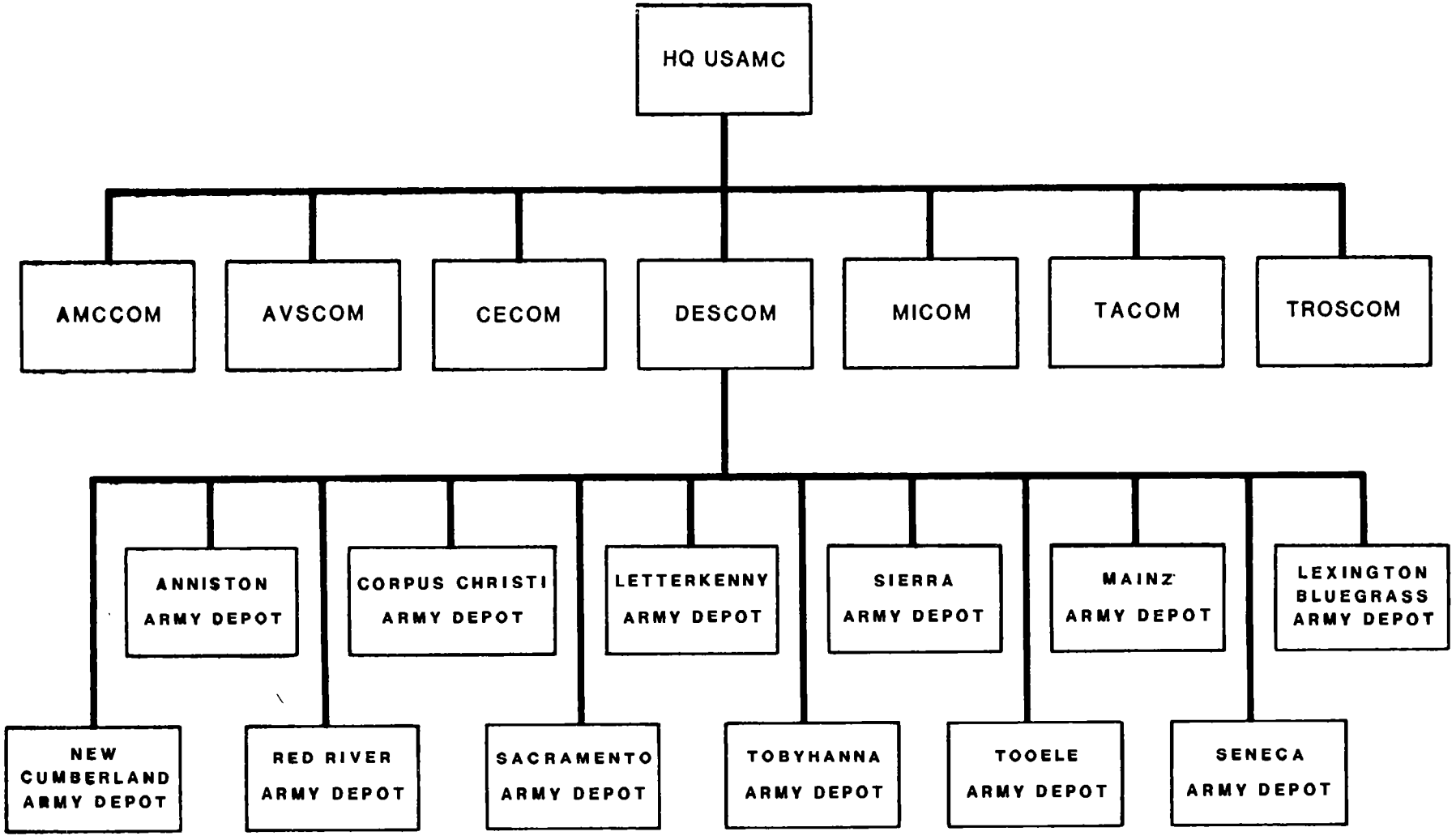
(2) When necessary, depot maintenance elements perform intermediate general support maintenance, including repair, to assist in returning materiel to combat. This is accomplished in fixed facilities, as necessary, but the preferred concept is one of forward support to complement the forward orientation of retail support levels. Whenever feasible, intermediate general support maintenance required of depot organizations is performed onsite.

e. Maintenance in the Corps.

(1) The materiel management center (MMC) of the corps support command (COSCOM) accomplishes integrated maintenance and supply support in a theater of operations. The COSCOM MMC provides interface between the wholesale logistics level (NICP/NMP) and supported forces. The MMC discharges day-to-day materiel management responsibilities under a concept of centralized management and decentralized operations. Acting on the requirements of supported forces, the MMC places supply demands on the Theater Army MMC (if more than one corps) or CONUS-based NICPs of AMC, the Defense Logistics Agency, and the General Services Administration. The MMC may also meet support demands through local procurement and by redistributing supplies and maintenance assets within the command. Materiel maintenance managers are authorized for each commodity division. Their responsibilities include:

- Plan day-to-day for operations.
- Implement coordinating staff policies and plans.
- Develop and apply operating procedures.
- Make continuing analyses of operations.
- Apply corrective action.
- Develop plans and programs to support requirements of the coordinating staff.
- Apply priorities.
- Make management decisions.

(2) Each maintenance branch in divisions of the COSCOM MMC exercises management control over the routine maintenance activities and the maintenance collection efforts of units assigned or attached to the COSCOM. The maintenance branches perform routine maintenance management on a day-to-day basis, and collect maintenance data generated by corps units and division materiel management centers (DMMC). The maintenance branches also receive and use information obtained from the equipment and supply branches and the service support division of the MMC as well as from the DMMCs.



SAVANNA ARMY DEPOT ACTIVITY
NAVAJO ARMY DEPOT ACTIVITY
MIESAU ARMY DEPOT

RESERVE STORAGE ACTIVITY-CAERWENT
CAMP DARBY
US ARMY AMMUNITION DEPOT (JAPAN)
19TH SUPPORT COMMAND (KOREA)

FORT WINGATE DEPOT ACTIVITY
PUEBLO DEPOT ACTIVITY
UMATILLA DEPOT ACTIVITY

Figure 4-1. U.S. ARMY DEPOTS AND DEPOT ACTIVITIES

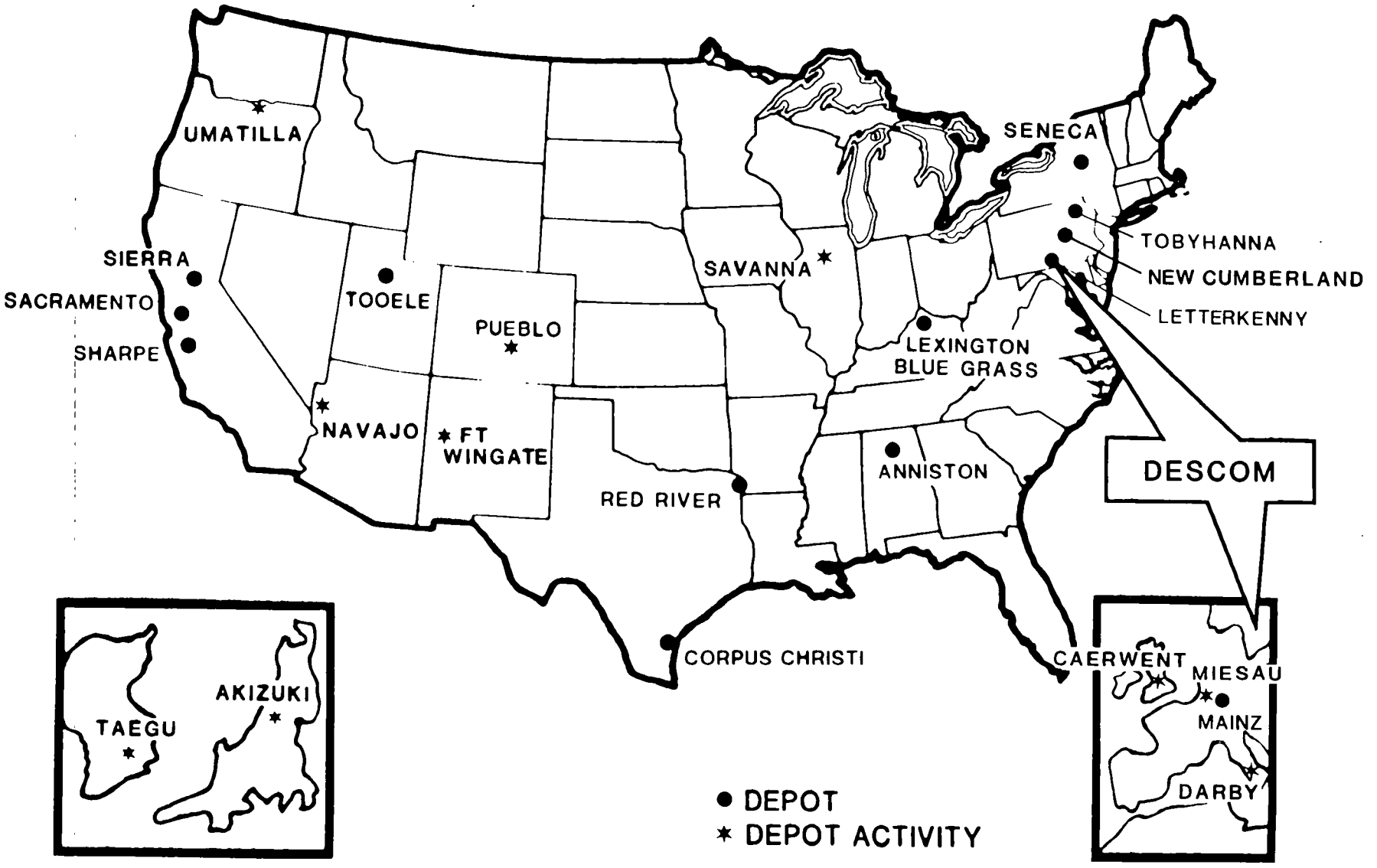
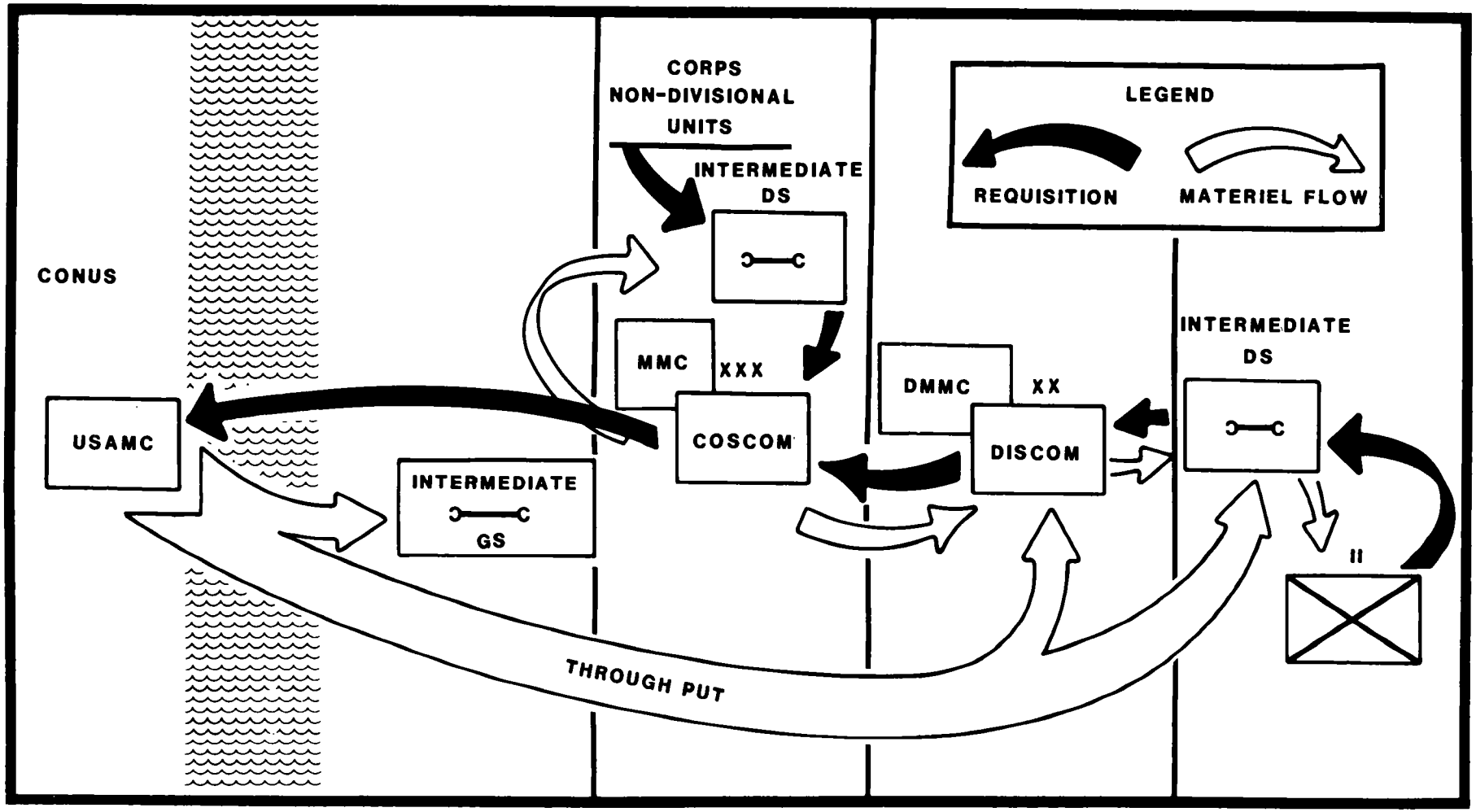


Figure 4-2. AMC ORGANIZATION FOR MAINTENANCE



REQUEST AND MATERIEL FLOW FOR CLASS IX AND MAINTENANCE RELATED CLASS II SUPPLIES (ALOC)

Figure 4-3. FLOW OF MAINTENANCE AND SUPPLY (CLASS IX) SUPPORT IN THE THEATER

ANNISTON ARMY DEPOT	HEAVY COMBAT VEHICLES
	ANTI-TANK MISSILES
	SMALL ARMS WEAPONS
	AMMUNITION
CAMP DARBY	AMMUNITION
CORPUS CHRISTI ARMY DEPOT	HELICOPTERS
	AIRCRAFT ENGINES, TRANSMISSIONS,
	ROTOR BLADES AND HEADS
ELECTRONIC MATERIEL READINESS ACTIVITY DEPOT	STRATEGIC/TACTICAL/SIGNAL INTELLIGENCE/ELECTRONIC WARFARE EQUIPMENT
FORT WINGATE ARMY ACTIVITY	AMMUNITION
LETTERKENNY ARMY DEPOT	AIR DEFENSE MISSILES
	SELF PROPELLED AND TOWED ARTILLERY AMMUNITION
LEXINGTON BLUEGRASS ARMY DEPOT	AMMUNITION
	COMMUNICATIONS SECURITY EQUIPMENT
MAINZ ARMY DEPOT	COMBAT VEHICLES
MIESAU ARMY DEPOT	AMMUNITION
NAVAJO ARMY DEPOT ACTIVITY	AMMUNITION
NEW CUMBERLAND ARMY DEPOT	AIR DELIVERY ITEMS
PUEBLO ARMY DEPOT ACTIVITY	PERSHING MISSILE
	AMMUNITION
RED RIVER ARMY DEPOT	LIGHT COMBAT VEHICLES
	AIR DEFENSE MISSILES
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UMATILLA ARMY DEPOT ACTIVITY.....AMMUNITION
US ARMY AMMUNITION DEPOT (AKIZUKI, JAPAN).....AMMUNITION
19TH SUPPORT COMMAND (TAEGU, KOREA).....AMMUNITION

NOTE: The Electronic Systems Specialized Repair Activity, a CECOM element assigned to the US Army Electronics Materiel Readiness Activity, performs up to depot level maintenance on low density EW/SIGINT equipment.

APPENDIX A

REFERENCES

A-1. Department of Defense Directives

4000.19	Interservice, Interdepartmental, and Interagency Support
4005.1	DOD Industrial Preparedness Production Planning
4100.15	Commercial and Industrial-Type Activities
4151.1	Use of Contractor and DOD Resources for Maintenance of Materiel
4151.17	Overseas Depot Maintenance
5000.1	Major System Acquisitions
5010.19	Configuration Management
5160.65	Single Manager for Conventional Ammunition
5160.65-M	Implementing Joint Conventional Ammunition Polcies and Procedures

A-2. Department of Defense Instructions

4005.3	Industrial Preparedness Production Planning Procedures
4100.33	Operation of Commercial and Industrial-Type Activities
4151.15	Depot Maintenance Support Programming Policies
7220.29-H	Department of Defense Depot Maintenance and Maintenance Support Cost Accounting and Production Reporting Handbook (C)

A-3. Army Regulations

1-1	Planning, Programming, and Budgeting within the Department of the Army
11-14	Logistic Readiness
37-55	Uniform Depot Maintenance Cost Accounting and Production Reporting System
37-100-79	The Army Management Structure (AMS)
40-61	Medical Logistics Policies and Procedures
70-1	Systems Acquisition Policy and Procedure
70-10	Test and Evaluation During Development and Acquisition of Materiel
70-15	Product Improvement of Materiel
70-37	Configuration Management
71-2	Basis of Issue Plans (BOIP), Qualitative and Quantitative Personnel Requirements Information (QQPRI)
71-3	User Testing
71-9	Materiel Objectives and Requirements
220-1	Unit Status Reporting
310-3	Preparation, Coordination, and Approval of Department of the Army Publications
310-25	Dictionary of United States Army Terms
310-50	Catalog of Abbreviations and Brevity Codes
350-35	Army Modernization Training
(C) 381-143	Logistic Policies and Procedures
570-2	Manpower and Equipment Control Organization and Equipment Requirements Tables—Personnel
700-4	Logistic Assistance Program
700-8	Logistic Planning Factor Management
700-9	Policies of the Army Logistics System
700-18	Provisioning of US Army Equipment
700-74	Interservice (Depot) Maintenance Interrogation System (ISMIS)

700-90	Army Industrial Preparedness Program
700-120	Material Distribution Management for Major Items
700-126	Basic Function Structure
700-127	Integrated Logistic Support (ILS)
700-132	Joint Oil Analysis Program (JOAP)
702-3	Army Materiel Systems Reliability, Availability, and Maintainability (RAM)
702-13	Army Warranty Program
710-1	Centralized Inventory Management of the Army Supply System
750-1	Army Materiel Maintenance Concepts and Policies
750-1	Army Oil Analysis Program
750-4	Depot Materiel and Support Training Actvities
750-10	Modification of Materiel and Issuing Safety-of-Use Messages and Commercial Vehicle Safety Recall Campaign Directive
750-25	Army Test, Measurement, and Diagnostic Equipment (TMDE) Calibration and Repair Support Program
750-37	Sample Data Collection: The Army Maintenance Management System
750-43	Test, Measurement, and Diagnostic Equipment
750-51	Maintenance Assistance and Instruction Team (MAIT) Program
1000-1	Basic Policies for System Acquisition

A-4. Department of the Army Pamphlets

11-25	Life-Cycle System Management Model for Army Systems
738-750	The Army Maintenance Management System (TAMMS)
750-40	Guide to Reliability Centered Maintenance (RCM) for Field Equipment

A-5. Field Manuals

38-704	US Army Material Command Logistic Control Activity and its Role in Management of the Army's Supply Distribution Pipeline
38-725	Direct Support System (Management and Procedures)
63-3	Combat Service Support Operations-Corps (How to Support)
54-10	Logistics: An Overview of the Total System
700-80	Logistics

A-6. Miscellaneous Publications

Office of Management and Budget (OMB) Circular A-76

APPENDIX B

ACRONYMS

ADP	Automatic Data Processing
ALOC	Air Line of Communication
AMC	Army Material Command
AMIM	Army Modernization Information Memorandum
AMCCOM	US Army Armament Munitions and Chemical Command
ASL	Authorized Stockage List
ATLP	Army-Wide Training Literature Program
AVCRAD	Aviation Classification Repair Activity Depot
AVIM	Aviation Intermediate Maintenance
AVSCOM	US Army Aviation Systems Command
AVUM	Aviation Unit Maintenance
AWLL	Army Wholesale Logistics Literature
BOI	Basis of Issue
CCSS	Commodity Command Standard System
CECOM	US Army Communication-Electronics Command
COCO	Contractor Owned Contractor Operated
COMMZ	Communications Zone
CONUS	Continental United States
COSCOM	Corps Support Command
CWO	Conversion Work Order
DCSLOG	Deputy Chief of Staff for Logistics
DESCOM	US Army Depot System Command
DMISA	Depot Maintenance Interservice Support Agreement
DMMC	Division Materiel Management Center
DMWR	Depot Maintenance Work Requirement
DOD	Department of Defense
DS	Direct Support
DSS	Direct Support System
DSU	Direct Support Unit
EIR	Equipment Improvement Recommendation
ERADCOM	US Army Electronics Research and Development Command
FORSCOM	US Army Forces Command
GOCO	Government Owned Contractor Operated
GS	General Support
GSU	General Support Unit
HQDA	Headquarters, Department of the Army
ILS	Integrated Logistic Support
ILSP	Integrated Logistic Support Plan
LCMM	Life-Cycle Management Model
LSA	Logistics Support Analysis
MAC	Maintenance Allocation Chart
MACOM	Major Army Command
MEMO	Mission Essential Maintenance Operations
MFP	Materiel Fielding Plan
MICOM	US Army Missile Command
MMC	Materiel Management Center
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSU	Major Subordinate Command
MWO	Modification Work Order
MWOFP	Modification Work Order Fielding Plan
NET	New Equipment Training
NETT	New Equipment Training Team
NICP	National Inventory Control Point
NMP	National Maintenance Point
ORF	Operational Readiness Float
OST	Order and Ship Time
PIP	Product Improvement Program
PLL	Prescribed Load Lists
POMCUS	Pre-Positioned Materiel Configured to Unit Sets
PURE	POMCUS Unit Residual Equipment
QDR	Quality Deficiency Report
RAM	Reliability, Availability, and Maintainability

RCF	Repair Cycle Float
RX	Reparable Exchange
SAMS	Standard Army Maintenance System
SDC	Sample Data Collection
SDS	Standard Depot System
SLAC	Support List Allowance Card
TACOM	US Army Tank-Automotive Command
TAMMS	The Army Maintenance Management System
TMDE	Test, Measurement, and Diagnostic Equipment
TOE	Table of Organization and Equipment
TRADOC	US Army Training and Doctrine Command
TROSCOM	US Army Troop Support Command

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